IN THE CLAIMS:

Please amend the claims as follows.

A complete listing of all the claims is as follows:

Claims 1 to 86. (Previously Canceled).

Claim 87. (Currently Amended).

Procedure for the determination of the quality of gas of a probe gas ~~(1), in particular a burnable gas~~, proceeding from a transmission spectrum of the probe gas ~~(1)~~ determined at operating conditions by means of spectroscopical methods of measurement,

~~characterized in that~~ comprising,

- determining at operating conditions out of the transmission spectrum the amounts of substances $x_i$ of the components of the probe gas ~~(1) are determined at operating conditions,~~,

- presetting default values for a compressibility factor K and real gas factor $Z_n$ ~~are preset~~ for calculation of the ~~wanted~~ compressibility factor K,

- out of quantities at operating conditions of the probe gas ~~(1)~~ as well as from the amounts of substances $x_i$ and substance specific quantities and taking into account of the ~~selected~~ preset default values for compressibility factor K and real gas factor $Z_n$ determining input quantities for the determination of the compressibility factor K ~~are determined,~~ ,

- calculating with these input quantities the compressibility factor K ~~is calculated~~ by means of a standard ~~standard~~-arithmetic ~~procedures,~~ procedure,

- carrying out an iterative calculation in the way of an iterative recalculation of the input quantities ~~is carried out~~ with the determined value for the compressibility factor K ~~as long~~, until the value of the compressibility factor K converges and ~~than there~~ then from the volumetric standard calorific value $H_{v,n}$ ~~and~~ the standard density $\rho_n$ is calculated.

Claim 88. (Currently Amended).

The procedure ~~Procedure~~ according to claim 87, ~~characterized in that~~ wherein as standard-arithmetic procedure the method of iteration AGA8-92DC is used.

Claim 89. (Currently Amended).

The procedure ~~Procedure~~ according to claim 87, ~~characterized in that~~ wherein as standard-arithmetic procedure the method of iteration GERG88 is used.

Claim 90. (Currently Amended).

The procedure ~~Procedure~~ according to claim 87, ~~characterized in that~~ wherein the amounts of substances $x_i$ of ~~the~~ infrared active components of the probe gas ~~(1)~~ at operating conditions is determined starting from the recorded transmission spectrum by means of multivariate analysis (MVA).

Claim 91. (Currently Amended).

The procedure ~~Procedure~~ according to claim 87, ~~characterized in that~~ wherein the default values of the compressibility factor K ~~und~~ and the real gas factor $Z_n$ are and taken from a characteristic diagram, that describes the influence of the pressure $p_b$ at operating conditions and the temperature $T_b$ at operating conditions for a known composition of a gas similar to the composition of the probe gas ~~(1)~~.

Claim 92. (Currently Amended).

The procedure ~~Procedure~~ according to claim 87, ~~characterized in that~~ wherein directly from the transmission spectrum the amounts of substances of the infrared active components of the probe gas ~~(1)~~ at operating conditions and the amount of nitrogen $N_2$ of the probe gas ~~(1)~~ are determined as a function of the amounts of substances of the infrared active components of the probe gas ~~(1)~~.

Claim 93. (Currently Amended).

The procedure ~~Procedure~~ according to claim 92, ~~characterized in that~~ wherein the amount of substance of nitrogen $N_2$ and the amounts of substances of the infrared active components complements each other resulting in the total volume of the probe gas ~~(1)~~.

Claim 94. (Currently Amended).

Procedure for the determination of the quality of gas of a probe gas ~~(1), in particular a burnable gas,~~ proceeding from a transmission spectrum of the probe gas ~~(1)~~ determined at operating conditions by means of spectroscopical methods of measurement, ~~characterized in that~~ comprising,

- presetting default values for compressibility factor K and real gas factor $Z_n$ ~~are preset~~ for calculation of the wanted compressibility factor K,

C2 Cont'd

- from the pressure $p_b$ at operating conditions and the temperature $T_b$ at operating conditions of the probe gas ~~(1)~~ with the values for the calorific value $H_{v,b}$ at operating conditions and the density $\rho_b$ at operating conditions, which can be directly determined out of the spectrum, determining input quantities for the determination of the compressibility factor K ~~are determined,~~

- as further input quantity determining the molar amount of substance of $CO_2$ ~~is determined~~ by means of a further absorption band of the spectrum,

- with these input quantities calculating the compressibility factor K ~~is calculated~~ by means of the iterational procedure GERG88,

- carrying out an iterative calculation in the way of an iterative recalculation of the input quantities ~~is carried out~~ with the determined value for the compressibility factor K ~~as long,~~ until the value of the compressibility factor K converges and ~~than there~~

~~from~~ then from the volumetric standard calorific value $H_{v,n}$ ~~and~~ the standard density $\rho_n$ is calculated.

C1 Cont'd

Claim 95. (Currently Amended).

The procedure ~~Procedure~~ according to claim 94, ~~characterized in that~~ wherein the calorific value $H_{v,b}$ at operating conditions and the density $\rho_b$ at operating conditions are determined by means of spectral functions for weighting of a value directly from the transmission spectrum of the probe gas ~~(1).~~

Claim 96. (Currently Amended).

The procedure ~~Procedure~~ according to claim 95, ~~characterized in that~~ wherein with the spectral functions for weighting of a value the weighted influence of the amounts of substances of the components of the probe gas ~~(1)~~ is described for the calorific value $H_{v,b}$ at operating conditions and the density $r_b$ at operating conditions.

Claim 97. (Currently Amended).

The procedure ~~Procedure~~ according to claim 95, ~~characterized in that~~ wherein the default values for compressibility factor K and real gas factor $Z_n$ are taken from a characteristic diagram, that describes the influence of the pressure $p_b$ at operating

conditions and the temperature $T_b$ at operating conditions for a known composition of a gas similar to the composition of the probe gas ~~(1)~~.

Claim 98. (Currently Amended).

Photometric device for the determination of a transmission spectrum of a probe gas ~~(1), especially for carrying out one of the procedures according to claim 87~~, ~~showing~~ comprising

a radiation source ~~(2)~~ emitting a measurement radiation ~~(8)~~, in which the measurement radiation ~~(8)~~ passes through a probe cell ~~(3)~~ for capturing a probe gas ~~(1)~~ and enters after passing through a modulation unit ~~(6)~~ for modulating the measurement radiation ~~(8)~~ into at least one radiation receiver ~~(7)~~, which generates electrical measurement signals ~~(9)~~ according to ~~the~~ an incoming intensity of the measurement radiation ~~(8)~~ and transmits these to an electronical unit ~~(10)~~, which determines ~~a~~ said transmission spectrum out of the measurement signals ~~(9)~~, wherein the modulation unit ~~(6)~~ shows a spectral switch unit ~~(46, 47)~~ in the form of a chopper arrangement ~~(28)~~, which transmits because of their selective transmission behaviour only specific spectral regions of the transmission spectrum in the measurement radiation ~~(8)~~ caused by the probe gas ~~(1)~~ to the radiation receiver ~~(7);~~ and

~~characterized in that~~

wherein the chopper arrangement ~~(28)~~ is provided with an aperture ~~(46)~~ with a spiral opening ~~(31),~~ in which the release of the regions of the wavelength of the measurement radiation ~~(8)~~ is caused continuously for the whole spectrum.

C2 Cont'd

Claim 99. (Currently Amended).

~~Photometric~~ The photometric device according to claim 98, ~~characterized in that~~ wherein the chopper arrangement ~~(28)~~ provides such a transmission spectrum ~~behaviour~~, that the transmitted spectral regions are suitable for the further evaluation by procedures of the direct spectral evaluation (DSA).

Claim 100. (Currently Amended).

~~Photometric~~ The photometric device according to claim 98, ~~characterized in that~~ wherein the ~~released~~ release of the regions of the wavelength of the measurement radiation ~~(8)~~, which passes through the chopper arrangement ~~(28)~~, can be obtained by means of capturing the rotational position of the aperture ~~(46)~~.

Claim 101. (Currently Amended).

~~Photometric~~ The photometric device according to claim 98, ~~characterized in that~~ wherein the chopper arrangement ~~(28)~~ is provided with two groups of sector elements ~~(36, 37)~~

alternatively releasing the measurement radiation ~~(8)~~, in which a first optical waveguide ~~(34)~~ guides the measurement radiation ~~(8)~~ released by the sector elements of the first sector element group ~~(36)~~ into the probe cell ~~(3)~~ and after passing through the probe cell ~~(3)~~ to the radiation receiver ~~(7)~~ and a second optical waveguide ~~(35)~~ guides the measurement radiation ~~(8)~~ released by the sector elements of the second sector element group ~~(37)~~ directly to the radiation receiver ~~(7)~~.

Claim 102. (Currently Amended).

~~Photometric~~ The photometric device according to claim 101, ~~characterized in that~~ wherein the measurement radiation ~~(8)~~ released by the sector elements of the first and second sector element groups ~~(36, 37)~~ are concentrated by means of said first optical waveguide ~~(34)~~ and said second optical waveguide ~~(35)~~ into one or more filters ~~(21)~~ or a dispersive element ~~(6)~~, ~~preferably~~ or a monochromator ~~(32)~~.

Claim 103. (Currently Amended).

~~Photometric~~ The photometric device according to claim 102, ~~characterized in that~~ wherein the radiation receiver ~~(7)~~ collects the measurement radiation ~~(8)~~, which is coming out of the one or more filters or the dispersive element and each released through

the sector elements of the sector element groups ~~(36, 37)~~ of both optical waveguides ~~(34, 35)~~.

C2 Cont'd

Claim 104. (Currently Amended).

~~Photometric~~ The photometric device according to claim 101, ~~characterized in that~~ wherein the measurement radiation ~~(8)~~, which is released through the sector elements of the sector element groups ~~(36, 37)~~ of that first optical waveguide ~~(34)~~, which is guided directly to the radiation receiver ~~(7)~~, is usable as reference for eliminating the influence of $CO_2$, which exists in the surrounding of the probe cell ~~(3)~~ and/or of the photometric device, of changes of the radiation source ~~(2)~~ and/or of the radiation receiver ~~(7)~~.

Claim 105. (Currently Amended).

~~Photometric~~ The photometric device according to claim 101, ~~characterized in that~~ wherein the measurement radiation ~~(8)~~, which is each released through the sector elements of the first and second sector element groups ~~(30, 31)~~, is guided through the first and the second optical waveguide (34, 35) to the input of ~~the~~ one or more filters ~~(21)~~ or ~~the~~ a dispersive element ~~(6)~~, in which at the chopper arrangement (28) also available ~~further~~ sector element groups ~~(36, 37)~~ lock on the measurement radiation ~~(8)~~, which is released of the one or more filters ~~(21)~~ or the

dispersive element ~~(6)~~, alternatively to the radiation receiver ~~(7)~~.

Claim 106. (Currently Amended).

~~Photometric~~ The photometric device according to claim 102, ~~characterized in that~~ wherein the measurement radiation ~~(8)~~, which is each released through the sector elements ~~(30, 31)~~, is guided together by means of the first and the second optical waveguides ~~waveguide (34, 35)~~ in a Y-fibre coupler ~~(38)~~, which guides the measurement radiation ~~(8)~~ of the first and the second waveguide ~~(34, 35)~~ to the one or more filters ~~(21)~~ or the dispersive element ~~(6)~~.

Claim 107. (Currently Amended).

~~Photometric~~ The photometric device according to claim 105, ~~characterized in that~~ wherein the chopper arrangement ~~(28)~~ carries out both the selection of the wavelengths for the transmission spectrum as well as the alternating reverse of the measured section between the first and second optical waveguides ~~(34, 35)~~.

Claim 108. (Currently Amended).

~~Photometric~~ The photometric device according to ~~one of the claims~~ claim 101, ~~characterized in that~~ wherein the probe cell ~~(3)~~ is sweepable with an infrared inactive gas, preferably ~~nitrogen $N_2$,~~ for carrying out a null measurement for the compensation of dirt accumulation ~~or the same~~ of the optical facilities ~~(2, 7, 32)~~ of the photometric device.